

(12) **United States Patent**
Tekolste et al.

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(54) **OUTCOUPLING GRATING FOR AUGMENTED REALITY SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 8 days.

This patent is subject to a terminal disclaimer.

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(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

An eyepiece for use in front of an eye of a viewer includes a waveguide configured to propagate light therein, and a diffractive optical element optically coupled to the waveguide. The diffractive optical element includes a plurality of first ridges protruding from a surface of the waveguide. Each of the plurality of first ridges has a first height and a first width. The diffractive optical element further includes a plurality of second ridges. Each of the plurality of second ridges protrudes from a respective first ridge and has a second height greater than the first height and a second width less than the first width. The diffractive optical element is configured to diffract a portion of a light beam incident on the diffractive optical element toward the eye as a first order transmission.

19 Claims, 23 Drawing Sheets

